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ABSTRACT

Distance learning is quickly becoming an accepted and even necessary part of college and university programs. As more colleges and universities join the growing ranks of institutions offering distance learning, educators and administrators are struggling with the issue of how to assess student success in this new and largely untested environment. Many distance learning providers, and even some institutions, have developed short surveys that are designed to gauge whether a student is prepared to undertake distance learning. These tests, however, may not accurately assess a student's predisposition and learning style. This paper highlights and compares the use of different learning style inventories as a means to formally and empirically assess learning styles. Students in both distance learning and traditional classroom courses were given several of these inventories and their progress was tracked. Initial results indicate that some of these can be used as a successful predictor of student performance and may be useful for students and administrators in determining whether or not the student should undertake a distance learning course or program. The paper concludes with some suggestions and implications for educators on distance learning. Includes two figures. (Contains 15 references.) (Author)

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STUDENT LEARNING STYLES & DISTANCE LEARNING

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ABSTRACT

Distance learning is quickly becoming an accepted and even necessary part of college and university programs. As more colleges and universities join the growing ranks of institutions offering distance learning, educators and administrators are struggling with the issue of how to assess student success in this new and largely untested environment. Many distance learning providers, and even some institutions, have developed short surveys that are designed to gauge whether a student is prepared to undertake distance learning. These tests, however, may not accurately assess a student's predisposition and learning style. This paper highlights and compares the use of different learning style inventories as a means to formally and empirically assess learning styles. Students in both distance learning and traditional classroom courses were given several of these inventories and their progress was tracked. Initial results indicate that some of these can be used as a successful predictor of student performance and may be useful for students and administrators in determining whether or not the student should undertake a distance learning course or program. The paper concludes with some suggestions and implications for educators on distance learning.

INTRODUCTION

Distance learning has become an established, accepted part of many college and university offerings and, in some cases, represents a major portion of the curricula. Given the technological advances and broad reach of the Internet, this is not surprising. Students and administrators alike are demanding such programs given the changing student demographics and societal needs. As the traditional college populations change, the need for programs which address convenient, flexible, and adaptable learning increases. Life-long learning and re-tooling also necessitate programs which can accommodate full-time workers and those with familial obligations. Need notwithstanding, distance learning providers have not spent much time investigating whether or not this new pedagogy is suitable for everyone and how to assess who might benefit from it.

Many institutions offer distance-learning courses and/or programs but have little or no pre-assessment for students. They feel that the need for such courses and programs is justified, however they often do not provide a way for prospective students to assess their level of readiness for such programs. This is especially true for those students who have been away from the classroom environment for some time and are now returning to continue a course of study or re-tool in a new area. This paper begins with an exploration of some of the ways in which students are currently tested, highlights and compares several different learning style inventories, and presents initial findings from both on-campus and on-line classes with respect to student learning styles. It concludes with general suggestions for educators and administrators on how to assess student readiness for this new environment. Future research will gather data from a much larger population to assess which learning style assessment, if any, is most suitable for assessing student readiness for this new and largely unexplored pedagogy.

EXISTING ASSESSMENTS

A few of the commercial distance learning providers have developed their own self-assessment surveys or questionnaires to assist students in deciding whether or not to undertake a distance learning course or program.

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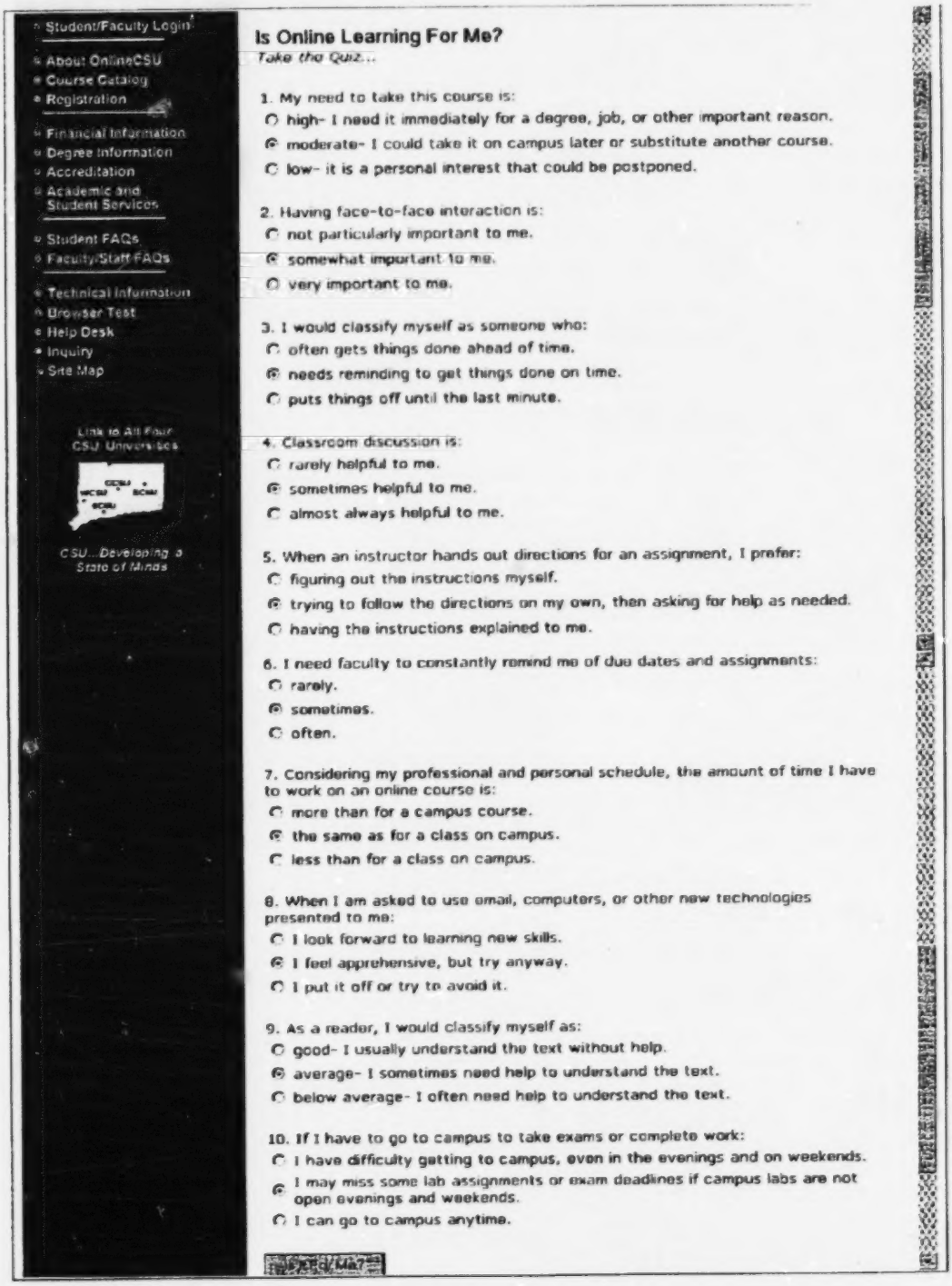
Some are very short, others are more comprehensive and thorough. For example, one of the providers, eCollege™, uses a short 10-question quiz to assess potential student success (http://www.onlinecsu.ctstateu.edu/index.real?action=IsOnline).


Student/Faculty Login
About OnlineCSU
Course Catalog
Registration
Financial Information
Degree Information
Accreditation
Academic and Student Services
Student FAQs
Faculty/Staff FAQs
Technical Information
Browser Test
Help Desk
Inquiry
Site Map
Link to All Four CSU Universities
CSU...Developing a State of Minds
Is Online Learning For Me?
Take the Quiz...
1. My need to take this course is:
high- I need it immediately for a degree, job, or other important reason.
moderate- I could take it on campus later or substitute another course.
low- it is a personal interest that could be postponed.
2. Having face-to-face interaction is:
not particularly important to me.
somewhat important to me.
very important to me.
3. I would classify myself as someone who:
often gets things done ahead of time.
needs reminding to get things done on time.
puts things off until the last minute.
4. Classroom discussion is:
rarely helpful to me.
sometimes helpful to me.
almost always helpful to me.
5. When an instructor hands out directions for an assignment, I prefer:
figuring out the instructions myself.
trying to follow the directions on my own, then asking for help as needed.
having the instructions explained to me.
6. I need faculty to constantly remind me of due dates and assignments:
rarely.
sometimes.
often.
7. Considering my professional and personal schedule, the amount of time I have to work on an online course is:
more than for a campus course.
the same as for a class on campus.
less than for a class on campus.
8. When I am asked to use email, computers, or other new technologies presented to me:
I look forward to learning new skills.
I feel apprehensive, but try anyway.
I put it off or try to avoid it.
9. As a reader, I would classify myself as:
good- I usually understand the text without help.
average- I sometimes need help to understand the text.
below average- I often need help to understand the text.
10. If I have to go to campus to take exams or complete work:
I have difficulty getting to campus, even in the evenings and on weekends.
I may miss some lab assignments or exam deadlines if campus labs are not open evenings and weekends.
I can go to campus anytime.

The results of the exam, given a "middle of the road" set of responses as indicated above, are:

Online CSU
Welcome
Student/Faculty Login
About OnlineCSU
Course Catalog
Registration
Financial Information
Degree Information
Accreditation
Academic and Student Services
Student FAQs
Faculty/Staff FAQs
Technical Information
Browser Test
Help Desk
Inquiry
Site Map
Link to All Four CSU Universities
CCSU
ECSU
WCSU
SCSU
Central Connecticut State University
Eastern Connecticut State University
SCSU
Western Connecticut State University
Results
You scored: 20
20 points or higher- an online course is a real possibility for you.
Between 11 and 20 points- an online course may work for you, but you may need to make a few adjustments in your schedule and study habits to succeed.
Less than 10 points- an online course may not currently be the best alternative for you; talk to your counselor.
No matter what you scored, remember that online learning is not easy. Your professor will demand at least the same quality of work as they would receive from you in a face-to-face classroom. A similar number of hours will need to be committed throughout the course of a semester for an online course as to a face-to-face course. Remember that your course may include deadlines and instructions on assignments, but there will not be anyone telling you to "turn in your assignment." Online learning is convenient- you do not have to commute to campus, and you can attend class at your convenience- either early in the morning, late at night, or anytime in-between. Just remember, no matter when you decide to study, your professor will hold you accountable- so study hard, and have a great term!
eCollege

(http://www.onlinecsu.ctstateu.edu/index.real?action=IsOnline)

ANALYSIS

While the results may be helpful to a student, the point system illustrated above is vague and a variation on only one or two answers could result in a recommendation against distance learning. While the eCollege™ survey is easy to take, the accuracy of the results might be questionable in that students are not asked specific questions about their learning styles but rather more about the environment (e.g., their level of comfort with technology, ability to visit campus, and/or need for contact with the instructor).

It is interesting to note that as of mid-2001, national institutions such as the University of Phoenix™, Jones International University™ and Western Governors University™ do not offer any type of pre-assessment. They encourage the student to enroll and work with a counselor and/or technical support personnel to bring them up to speed in their environment. This is a common approach, but one that may subject the student to unnecessary stress as they attempt to work out their difficulties and determine the suitability of a distributed learning environment.

So how does a student determine if he/she will be successful in a distance-learning environment? They could enroll in one of these national or local institutions and "learn the ropes" and hope that they will be able to handle the rigors of learning without the benefit of an actual classroom setting. For older students and those who already have substantial work experience and/or a previous degree, this may not be a difficult adaptation. Students who will potentially require more assistance are those whose learning styles may not be amenable to a non-classroom setting. Local and regional institutions in

particular may target their own students or those in the local area rather than a national or international clientele. It is for these institutions that a more comprehensive assessment of learning style is beneficial (Sternberg, & Grigorenko, 1997).

OVERVIEW OF LEARNING INVENTORIES

There are numerous learning style assessments currently available. Some were designed for learning assessment in general while others have been adapted or modified to accommodate many of the newer learning styles and pedagogies.

One of the oldest and most well known ways of assigning students to a given learning style is that of Kolb's (1984) Learning Style Inventory (LSI). This assessment inventory consists of 36 words in 9 groupings of 4 each. The student is asked to rank each of the sets of words on a 1 to 4 scale, with 1 equating to least like the person, 4 being the most like the person. The four columns of words correspond to four learning style scales: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). Kolb uses Jung's (1977) typologies as the main foundation in the development of these learning styles. For example, the abstract conceptualization (AC) style "focuses on using logic, ideas, and concepts. It emphasizes thinking as opposed to feeling" while the concrete experimentation (CE) style "focuses on being involved in experiences and dealing with human situations in a personal way. It emphasizes feeling as opposed to thinking" (Kolb, 1984, 68-69).

Kolb's LSI has been criticized for its low reliability and validity measures (Freeman & Stumpf, 1978; Holman, Pavlice & Thorpe, 1997; Lamb & Certo, 1978; West, 1982), yet it has received equal support as a way of illustrating the different approaches to learning (Abbey et al, 1985; Kruzich et al, 1986; Nulty & Barrett, 1996; Raschick et al, 1998). As a result of the diverse opinions and findings, other methodologies are needed to provide a more stable platform with respect to validity and reliability of such an assessment. Other methodologies which will be included in this investigation include Tait and Entwistle's ASSIST (1996), Solomon and Felder's (1996) Index of Learning Styles (ILS), Honey and Mumford's (1992) Learning Styles Questionnaire (LSQ) and the Academic Self-Efficacy Scale (Eachus, 1993).

The ASSIST (Approaches and Study Skills Inventory for Students) instrument developed by Tait and Entwistle (1996) is a 38-item inventory which attempts to identify students with weak study strategies. It has four subscales which measure four approaches of studying and academic aptitude. The scales are deep (intention to understand, relation of ideas, active learning), surface (intention to reproduce, unrelated memorizing, passive learning), strategic (study organization, time management, intention to excel), and apathetic (lack of direction and interest). Students respond to items relating to each of these approaches along a five-point likert scale from "agree" to "disagree". A score for each of the approaches is determined by summing the scores from each of the items corresponding to each subscale.

Solomon and Felder's (1996) Index of Learning Styles (ILS), originally developed for engineering students, focuses on four bi-polar preference for learning scales. These include Active-Reflective, Sensing-Intuitive, Visual-Verbal, and Sequential-Global (Felder & Silverman, 1988). Active learners are those who learn by trying things and working with others. Reflective learners prefer to think things through and work alone. Sensing learners are oriented toward facts and procedures while Intuitive learners are more conceptual, innovative and focus on theories and meanings. Visual learners prefer visual representations of material such as pictures, diagrams and charts while verbal learners prefer written or spoken explanations. Sequential learners are linear and orderly in their thinking and learn in small incremental steps while Global learners are holistic thinkers who learn in large leaps. These bi-polar scales offer a good basis for comparison of learning types.

The Learning Styles Questionnaire (LSQ) developed by Honey and Mumford (1992) identifies four types of learners, Activists (e.g. enjoy new experiences, make intuitive decisions, dislike structure), Theorists (e.g. focus on ideas, logic and systematic planning, mistrust intuition), Pragmatists (e.g. favor practical approaches, group work, debate, risk-taking), and Reflectors (e.g. observe and describe, try to predict outcomes, try to understand meaning). According to the authors, individuals tend to rely on one of these approaches when they are engaged in learning.

Finally, the Academic Self-Efficacy Scale (Eachus, 1993) is a 23-item scale which assesses the extent to which students believe they have the ability to exert control over their academic environment. By totaling the scores from the items, a self-efficacy score can be determined. This can be useful for students to determine the extent to which a distance-learning environment will

be suitable for them. By knowing their level of self-efficacy, they will be in a better position to make a decision as to whether or not to pursue a more traditional course of study.

METHODOLOGY & PRELIMINARY RESULTS

Each of the assessment inventories highlighted above were administered to students in an on-campus sophomore level computer class focusing on hardware, software and networking. The same inventories were administered to students in a distance-learning course conducted during the summer of 2001. The course covered the same content as the on-campus course, but was delivered entirely over the Internet.

Preliminary analysis regarding each of the learning styles is presented below. A total of 40 students took part in this pilot study. 25 took the traditional on-campus class and 15 took the distance-learning class over the summer. The mean age was 19 for the on-campus class and 20 for the distance-learning class. There were 15 women and 10 men in the on-campus section and 11 men and 4 women in the on-line section. All were classified as full-time students although 80% reported working at least 20 hours per week while they took the courses. It must be noted here that this small sample size prevents the results that follow from being generalized to the general population. It is the author's intention to undertake a full study given the promising results of this initial pilot study.

Kolb categorizes four learning styles: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE). Analysis of the sample indicates that 75% of the students responded as Abstract Conceptualizers (AC) and 85% classified themselves as Active Experimenters (AE). Given the subject of the course, computer hardware and software, this is not surprising. It is interesting to note that more women (13%) then men (7%) categorized themselves as Reflective Observers (RO). This might be indicative of male-female personality differences, but this cannot be verified given the sample.

Analysis of Tait and Entwistle's (1996) ASSIST (Approaches and Study Skills Inventory for Students) instrument indicates that men (12%) are more inclined to be surface learners (e.g. more passive and inclined to memorize) than women (8%). Women outnumber men almost two-to-one in terms of deep (active learning, idea relation) learning (28% to 15%). Few students indicated an apathetic learning style and most were highly focused on strategic learning. Incidentally, this focus was much more pronounced in the on-line class (82%) than in the on-campus class (68%), possibly suggesting a greater need for time management and organization. This may have been the result, however of the shortened (six-week) class time period.

Solomon and Felder's (1996) Index of Learning Styles (ILS) focuses on four bi-polar scales. Active Learners try things out and prefer working with others while Reflective learners prefer to work alone and think things through. Students in both classes were largely Reflective learners, however this may be the result of their age and lack of experience with group settings. Sensing learners are more fact-oriented and Intuitive learners are more conceptual. Not surprisingly, students were more Sensing (87%) than Intuitive (56%), probably a result of their chosen major, computer information systems. People with an aptitude toward computers tend to be sensing and thinking which is in line with the Myers-Briggs Type Indicator. Students were also more Visual (92%) then Verbal (8%). This may be largely the result of age. Generation Y has grown up in a much more visually-oriented world and results may differ greatly if the population were not so homogeneous. Also not surprising is the all the students identified as being Sequential learners. This again may be a direct result of age.

The Learning Styles Questionnaire (LSQ) developed by Honey and Mumford (1992) identifies four types of learners: Activists, Theorists, Pragmatists, and Reflectors. Students identified largely as Theorists (72%) and to a lesser degree as Reflectors (15%). This may be the result of their level of learning—this was a sophomore class and students at this level are not required nor have they developed skills in group dynamics and intuitive decision-making. Honey and Mumford indicate that individuals tend to rely on one of these approaches when they are engaged in learning. This seems to hold true here.

Eachus' (1993) Academic Self-Efficacy Scale assesses the extent to which students believe they have the ability to exert control over their academic environment. Students' scores were all across the board here, some being very high and others relatively low. There does not seem to be a pattern with respect to gender or course

section. The small sample size may be a deciding factor and a larger sample size is needed to better understand the implications of self-efficacy.

Thus, from this preliminary analysis we find that there are some scales that seem to better predict learning outcome than others. Solomon and Felder's (1996) Index of Learning Styles (ILS) seems to have more consistent and applicable predictive value than the other scales. Kolb's (1984) Learning Style Inventory also seems to shed some light on which learning style is more prevalent in distance learning. The results of this pilot study suggest that a larger sample might be useful in determining whether or not these scales do indeed predict learning outcomes. Correlation with students' final grades might be even more of a significant factor. A follow-up study will be done to determine the effects of grade on learning style.

IMPLICATIONS FOR EDUCATORS

Given the sheer number of students who anticipate taking or are currently taking distance-learning courses, the need to be able to quickly and easily assess their potential level of success in these courses is paramount. Simply because it is an available alternative to the traditional classroom does not make it a viable option for everyone. Students have specialized needs and skills and not every student may be suited to a distance-learning environment. It is the responsibility of educators to make sure that students know and understand the risks and potential drawbacks to this environment. The last thing we want is for a student to be "lost in cyberspace" when a simple assessment early on might have identified the student as a poor candidate for distance learning. Regardless of the attractiveness and profitability of this new pedagogy, we must still be available for our students and provide them with every opportunity to further their education as they go forward on their journey in today's fast paced digital world.

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